**(12) PATENT APPLICATION** **(11)** Application No. **AU 199960667 A1**
**(19) AUSTRALIAN PATENT OFFICE**

(54) Title
**Container device for separately enclosing two different substances**

(51)[7] International Patent Classification(s)
**B65D 051/22** **B65D 041/50**
**B65D 017/44** **B65D 081/32**

(21) Application No: **199960667** (22) Application Date: **1999.11.26**

(43) Publication Date : **2001.05.31**
(43) Publication Journal Date : **2001.05.31**

(71) Applicant(s)
**Lily Hsu**

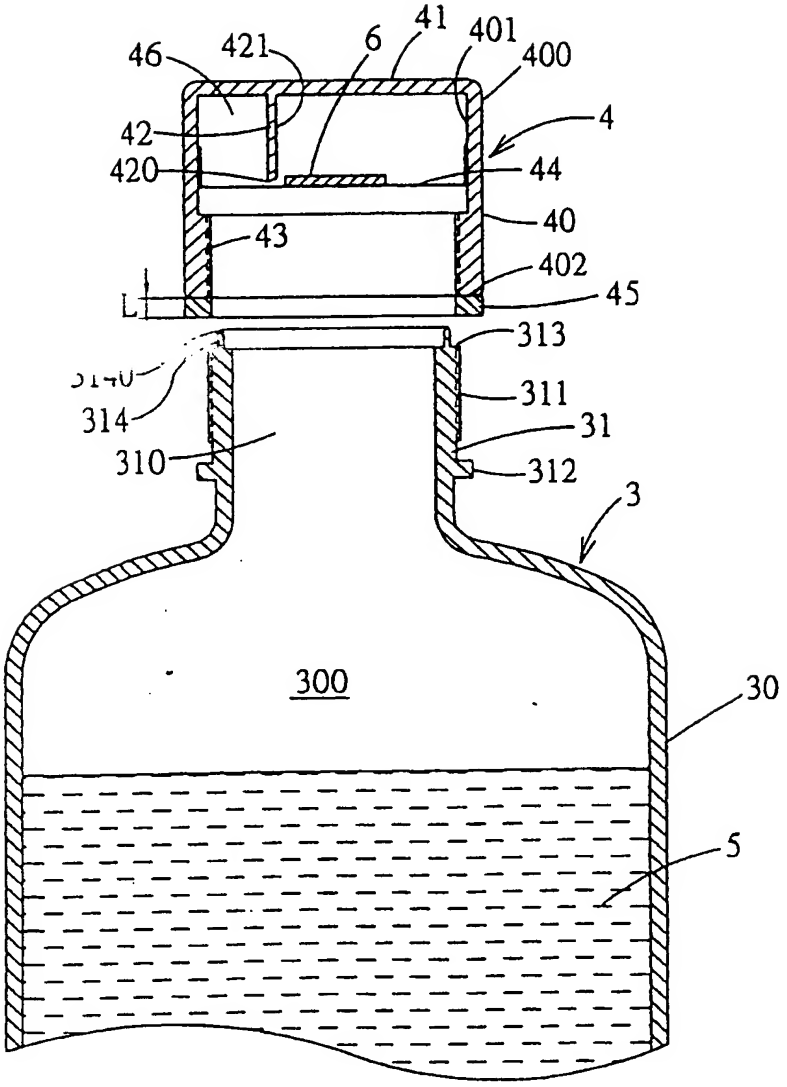
(72) Inventor(s)
**Lily Hsu**

(74) Agent/Attorney
**WALSH and ASSOCIATES,PO Box 4306,PENRITH PLAZA NSW 2750**

## ABSTRACT OF THE INVENTION

A container device for separately enclosing two different substances is provided. A cap member having an air-tight closure assembly is received therein for air-tightly encapsulating a second substance removably mounted to a body. The body is integrally formed with a neck on which the cap member is removably mounted and has storage space for receiving a first substance. In order to prevent the first substance from leaking out of the body, the air-tight closure assembly is adapted to be compatible with the neck of the body which allows the storage space to be sealed air-tightly to prevent leakage. To release the second substance from the air-tight closure assembly, a cutting member is provided to cut open the air-tight closure assembly, which is accomplished by downwardly moving the cap member to bring the air-tight closure assembly to be in contact with the cutting member.

FIG. 1


46
421
6
41
401
400
42
4
420
44
40
43
402
L
45
313
314
311
31
310
312
3
300
30
5

# CONTAINER DEVICE FOR SEPARATELY ENCLOSING TWO DIFFERENT SUBSTANCES

## BACKGROUND OF THE INVENTION

1. Field of the Invention:

This invention relates to container devices, and more particularly, to a container device having a body for enclosing one substance and a cap for closing an opening of the body so as to keep the other substance enclosed within the cap separate from the substance enclosed by the body.

2. Description of Related Art:

There has been a tendency for a beverage or a soft drink to come with a liquid solvent that is separate from a solute, which is usually in a form of tablet. This tablet is dissolved or mixed with the liquid solvent to become a drinkable solution at the time a person is to consume the drinkable solution. The reason why the solute is kept separate from the liquid solvent is such a drinkable solution is inappropriate for storage or to be in a ready-to-drink status and the solute is unstable with respect to the environment, such as moisture and air. Therefore, the solute should be sealed air-tight inside an enclosure prior to being dissolved in or mixed with the liquid solvent.

There are two types of conventional container devices, which provide the solute with a protective enclosure. One typically consists of a main container for retaining a liquid solvent and an annex container for retaining a solute. This type of container device requires a person to in turn open the main container and the annex container or vice versa in order to have the solute contact with the liquid solvent and thereby to become a drinkable solution. However, the problem is that two independent opening operations are necessary for making the aforementioned drinkable solution, causing this conventional container device to be inconvenient and complicated in operation.

Another type of conventional container devices is one including a container body having an opening for a plug assembly closably inserted thereinto and a storage space defined by the container body for retaining a liquid solvent. The plug assembly consists of a plug body having a guide sleeve, the guide sleeve having an upper end integral with the plug body and a lower end covered by a sealing member for retaining a solute inside the guide sleeve; and a tabular cutting member slidably plugged into the guide sleeve via the upper end of the guide sleeve. The tabular cutting member is capable of air-tight sealing the guide sleeve so as to prevent the solute received in the guide sleeve from being in contact with the ambient. In use, a user has to first remove from the container body a protection cover used to protect the tabular cutting member from being compressed prior to use, and then press down the tabular cutting member to separate the sealing member from the lower end of the guide sleeve in order to release the solute from the guide sleeve and to allow the solute to resolve in or mix with the liquid solvent in the container body. After this, the plug assembly is removed away from the container body for the user to consume the thus-obtained solution. Accordingly, the problem which comes with this type of container device is that it requires three steps to make available a solution ready for consumption. It is therefore laborious and inconvenient in operation.

## SUMMARY OF THE INVENTION

It is the objective of the present invention to provide a container device which is simpler and easier in operation than the prior art, allowing a second substance received in a cap member, originally separate from a first substance enclosed in a body cooperative with the cap member, to be in contact with the first substance and which is reliable in preserving the quality of the second substance as well as that of the first substance.

In accordance with the foregoing objective, the container device of the present

invention includes a hollow body having a neck integral therewith, the neck being formed with an opening penetrating through the neck to connect a storage space defined by the body for a first substance to be retained therein, and the neck being formed with an annular rib on its outer surface; a cap member reclosably coupled to the neck of the body for air-tightly closing the opening; an air-tight closure assembly received from inside the cap member for encapsulating a second substance and being synchronously movable with the cap member at the time the cap member is driven by a manual force to move in an axial manner along the neck of the body; a cutting means adapted for releasing the second substance from the air-tight closure assembly; and a collar detachably attached to a bottom of the cap member , allowing the cap member to be driven from an upper position where the air-tight closure assembly remains at a distance from the cutting means to a lower position where the bottom of the cap member abuts against the annular rib to thereby cause the air-tight manner of the air-tight closure assembly to be released by the cutting means, after the collar is detached from the cap member .

In one embodiment according to the invention, the air-tight closure assembly is formed by a sealing film circumferentially adhered to the inner surface of a side wall of the cap member, the inner surface of the side wall of the cap member, and the inner surface of a base wall attached to the side wall of the cap member. The second substance is thus capable of being encapsulated by the air-tight closure assembly and being isolated from the external environment. The air-tight closure structure should further cooperate with at least an annular protrusion upwardly protruded from the top surface of the neck in order to tightly seal the opening of the body to prevent leakage. The annular protrusion is adapted to abut against and upwardly push the sealing film of the air-tight closure structure in such a manner that the sealing film is deformed from a planar shape to a convex shape, after the cap member is mounted on the neck

of the body to a position that the collar attached to the bottom of the cap member abuts against the annular rib, allowing the first substance encapsulated in the body to be prevented from leaking.

In another embodiment according to the embodiment, the air-tight closure assembly comprises an inner housing having a downward-facing opening, a sealing film for an air-tight sealing of the downward-facing opening, and a closed space defined by the inner wall of the inner housing and the sealing film for receiving a second substance. The second substance can be placed in the inner housing and then the downward-facing opening is sealed with the sealing film, followed by installing the air-tight closure assembly of this embodiment inside the cap member by way of a conventional bonding method, ultrasonic melting method, engaging method or the like so as to have the air-tight closure assembly securely coupled to the cap member. Therefore, when the cap member is mounted on the neck of the body to a position that the collar of the cap member abuts against the annular rib, the annular protrusion on the top surface of the neck will upwardly push and tightly abut against the sealing film of the air-tight closure assembly so that the opening of the body is sealed air-tight to prevent leakage.

In a further embodiment according to the invention, the inner housing of the air-tight enclosure assembly is formed by a flexible annular body, which is outwardly curved and has a top end and a lower end, and a base substrate connected to the top end of the flexible annular body for closing the top end. The lower end of the flexible annular body is sealed by the sealing film for receiving a second substance within the closed space defined by the base substrate, flexible annular body and sealing film. As the cap member installed with the air-tight enclosure assembly is mounted to the neck of the body, the air-tight enclosure structure will partly be inserted into the opening of the body, making the flexible annular body be inwardly compressed by the neck of the

body so as to seal air-tight the opening of the body to prevent leakage.

The aforementioned first substance and second substance can be in a gas, liquid or solid form. Therefore, the first substance is capable of being chemically reacted with or physically resolved in or mixed with the second substance.

These and other features, and advantages, will be more clearly understood from the following detailed description taken in conjunction with the accompanying drawings. It is important to point out that the illustrations may not necessarily be drawn to scale, and that there may be other embodiments of the present invention which are not specifically illustrated.

## BRIEF DESCRIPTION OF DRAWINGS

FIG. 1 is a schematic sectional view of a container device in accordance with the first embodiment of the present invention, showing that the cap is separable from the body;

FIG. 2 is a schematic sectional view of the container device illustrated in FIG. 1 with the cap mounted to the body;

FIG. 3 is a schematic sectional view of the container device illustrated in FIG. 2 with its collar peeled off from the cap, followed by downwardly turning the cap clockwise by 90° to have the sealing film cut by the cutting means;

FIG. 4 is a schematic sectional view of the container device illustrated in FIG. 3 with the bottom of the cap abutting against the annular rib of the body;

FIG. 5 is a schematic sectional view of a cap for use in the container device in accordance with the second embodiment of the present invention with its air-tight closure assembly separable from the cap;

FIG. 6 is a schematic sectional view of the container device illustrated in FIG. 5 with its air-tight closure assembly installed within the cap;

FIG. 7 is a schematic sectional view of a cap for use in the container device in

accordance with the third embodiment of the present invention;

FIG. 8 is a schematic sectional view of the container device illustrated in FIG. 7 with its cap downwardly turned to a position that the bottom of the cap abuts against the annular rib of the body, after the collar of the cap is peeled off;

FIG. 9 is a schematic sectional view of a cap for use in the container device in accordance with the fourth embodiment of the present invention with its air-tight closure assembly separable from the cap; and

FIG.10 is a schematic sectional view of the cap illustrated in FIG.9 with its air-tight closure assembly installed within the cap.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawings most particularly FIGS. 1 and 2, a container device is illustrated according to the first embodiment of the present invention, and is seen to generally include a body 3 and a cap 4 for being removably mounted to the body 3.

The body 3 is typically in a cylindrical shape and is integrally formed with a neck 31 on its top. The neck 31 has an outer surface threaded to form a first threaded portion 311 and an inner surface opposing the outer surface defining a through opening 310 which connects a storage space 300 defined by an inner wall of the body 3 for receiving a liquid solvent 5. Beneath the first threaded portion 311 an annular rib 312 is further integrally provided on the outer surface of the neck 31. Also, on the top surface 313 of the neck 31 there is upwardly projected an annular protrusion 314. The annular protrusion 314 may be singly or concentrically multiply formed on the top surface 313 and may be in a simple circular shape, a wave-like circular shape, or the like.

The cap 4 has an annular body 40 with an the upper surface 400, a lower surface 402 opposing the upper surface 400, and an inner surface 401. A lid 41 is attached to the upper surface 400 of the annular body 40 in order to close one end of

the annular body 40 which is coupled with a cutting member 42 on its bottom surface extending toward the lower surface 402 of the annular body 40. On the inner surface 401 of the annular body 40 a second threaded portion 43 is formed to engage the first threaded portion 311 so as to securely mount the threadable cap 4 to the neck 31 of the body 3. A sealing film 44 made of a conventional flexible and extendible material, such as aluminum alloy, is provided so as to make a circumferential attachment to the inner surface 401 of the annular body 40 above the second threaded portion 43, allowing the sealing film 44, the inner surface 401 and the bottom surface of the lid 41 in combination to form an air-tight closure assembly to provide an air-tight room 46 for air-tightly encapsulating a solute 6 therein and for preventing external contaminants such as moisture or air from entering. In addition, a collar 45 is detachably coupled to both the lower surface 402 of the annular body 40 and the annular rib 312 of the neck 31 after the cap 4 is mounted to the body 3. The collar 45 is adapted to have a thickness L to allow the tip 420 of the cutting member 42 to remain separable from the sealing film 44,while the cap 4 is securably mounted to the body 3 by means of the collar 45 to allow the cap 4 to have a maximum turning of less than 360 degrees so as to prevent the sealing film 44 from being cut off from the annular body 40 by the cutting member 42, subsequent to the removal of the collar 45 from the cap 4. A more detailed description as to the relationship between the cap 4 and the body 3 will be given below.

As clearly shown in FIG. 2, the sealing film 44 is upwardly pressed by the annular protrusion 314 on the neck 31 of the body 3 to be deformed from a planar shape to a convex shape, while the threadable cap 4 is mounted to the neck 31 of the body 3 and is securable coupled to the annular rib 312 of the neck 31 by means of the collar 45. By this arrangement, the opening 310 of the neck 31 is liquid-tight, sealed by the sealing film 44, allowing the liquid solvent 5 received in the storage space 300

of the body 3 to prevent leakage through the opening 310 to the outside of the body 3. In the meantime, the tip 420 of the cutting member 42 is kept an appropriate distance from the sealing film 44, assuring that the solute 6 is encapsulated air-tight in the enclosed room 46. Also, the cap 4 is restrained from being turned downwardly toward the annular rib 312, if the collar 45 is held in position.

The cutting member 42 is formed with a tip 420 on its end and with a cutting edge 421 along one of its sides. Therefore, as shown in FIG. 3, when the collar 45 is peeled off, the cap 4 is allowed to be turned downward, clockwise toward the annular rib 312. With the downward movement of the cap 4 the cutting member 42 will simultaneously descend to allow the tip 420 of the cutting member 42 to first penetrate the sealing film 44 and the cutting edge 421 of the cutting member 42 to then cut open the sealing film 44, as the convex portion of the sealing film 44 will remain in position due to the annular protrusion 314 of the neck 31. Proceeding with the clockwise turning of the cap 4, the sealing film 44 is able to be cut wide-open to allow the solute 6 to drop by its gravity from the air-tight room 46 to the storage space 300 of the body 3 via the opening 310, as shown in FIG.4. As a result, the solute 6 can be solved in the liquid solvent 5 to become a drinkable solution for a person to consume.

The downward movement of the cap 4 ends at the time the lower surface 402 of the annular body 40 abuts against the annular rib 312 of the neck 31. It is the point that the cutting member 42 stops cutting open the sealing film 44. As the descending distance of the cap 4, which is corresponding to the thickness L of the collar 45, is set to limit the turning of the cap 4 to an extent of less than 360 degrees, the cutting member 42 is restrained from cutting off the sealing film 44 from the cap 4. Consequently, as shown in FIG. 4, the sealing film 44 is still partly attached to the inner surface 401 of the annular body 40 to thereby prevent the sealing film 44 from

When the collar 45b is peeled off, the cap 4b is allowed to descend. With the downward movement of the cap 4b by a clockwise turning force, the sealing film 422b simultaneously descends to approach the tip of the inner tubular body 22b which remains still in position. Proceeding to downwardly turn the cap 4b, the tip 222b is allowed to first penetrate the sealing film 422b, followed by cutting open the sealing film 422b by the peripheral edge 223b of the inner tubular body 22b. At the time the sealing film 422b is cut wide-open enough to let the solute 6b to drop by gravity, the solute 6b can free-fall from the encapsulating structure 42b to the storage space 300b to be dissolved in the liquid solvent 5b. The downward movement of the cap 4b concludes until the lower surface 402 of the cap 4b abuts the annular rib 312b of the body 3b. As the cap 4b is downwardly turned to an extent of less than 360 degrees, the sealing film 422b is not completely cut off from the encapsulating structure 42b and is still partly attached to the annular body 421b so as to prevent the sealing film 422b from dropping down to the storage space 300b.

FIGS. 9 and 10 are schematic sectional views of a cap for use in a container device according to the fourth embodiment of the present invention. The fourth embodiment is structurally similar to the third embodiment as described in the above, except for the structure of the cap. Accordingly, detailed description to the body is herein omitted for the purpose of simplification.

In the cap 4c of the fourth embodiment, a groove 403c is annularly formed on the inner surface 401c of the annular body 40c above the second threaded portion 43c in order to engage the peripheral rim 4240c of an inner lid 424c to cover the top end of the resilient and outwardly curved annular body 421c of the encapsulating structure 42c. An air-tight room 423c is thus formed by the annular body 421c, the inner lid 424c and the sealing film 422c for sealing the bottom end of the annular body 421c, and for an air-tight encapsulation of a solute 6c.

403a of the annular body 40a in order to securely couple the air-tight closure assembly 47a to the cap 4a, as shown in FIG.6.

FIGS. 7 and 8 are schematic sectional views of the container device according to the third embodiment of the present invention.

The container device according to the third embodiment of the present invention includes a cutting structure 2b, a body 3b for receiving the cutting structure 2b, and a threadable cap 4b mounted to the body 3b.

The cutting structure 2b has an outer tubular body 21b and an inner tubular body 22b coaxially received within the outer tubular body 21b and formed with a passage 221b. On the top end of the outer tubular body 21b a flange 211b is integrally formed and extending outward. A bottom cover 23b is provided to respectively connect the bottom ends of outer tubular body 21b and inner tubular body 22b and is formed with a plurality of through holes 231b for fluid to pass therethrough. In order to provide a cutting function with the inner tubular body 22b, the inner tubular body 22b is formed with a tip 222b and has its peripheral edge 223b become sharpened.

The body 3b is integrally formed with a neck 31b on its top. The neck 31b has an upper surface 313b, a cylindrical outer surface threaded to form a first threaded portion 311b, and a cylindrical inner surface defining an opening 310b connecting a storage space 300b defined by an inner wall of the body 3b for receiving a liquid solvent 5b. In addition, an annular rib 312b is integrally formed on the outer surface of the neck 31b below the first threaded portion 311b. The cutting structure 2b is adapted to be received within the opening 310b of the neck 31b so that the flange 211b abuts the upper surface 313b to hold the cutting structure 2b in position and so that the opening 310b can be connected to the passage 221b of the cutting structure 2b.

The cap 4b includes an annular body 40b having an upper end 400b, an inner surface 401b, a lower end 402b opposing the upper end 400b, a lid 41b attached to the upper end 400b for closing one end of the annular body 40b, and an encapsulating structure 42b mounted to the bottom surface of the lid 41b for encapsulating a solute 6b therein. The encapsulating structure 42b is formed which has a resilient and outwardly curved annular body 421b with one end adhered by any conventional adhering method to the lid 41b and with another end sealed by a sealing film 422b. The annular body 421b, the sealing film 422b and the lid 41b together form an air-tight room 423b for encapsulating a solute 6b therein. The bottom end of the outwardly curved annular body 421b is diametrically greater than the inner tubular body 22b but is diametrically smaller than the outer tubular body 21b; however, the middle of the annular body 421b is of a diameter greater than the outer tubular body 21b. As a result, the annular body 421b of the encapsulating structure 42b is subject to an inwardly pressing force caused by the inner wall 212b of the outer tubular body 21b, allowing the annular body 421b to abut liquid-tight against the inner wall 212b of the outer tubular body 21b thereby preventing the liquid solvent 5b from leaking out of the body 3b. Between the lower end 402b of the annular body 40b and the annular rib 312b, a collar 45b is detachably attached when the threadable cap 4b is mounted to the body 3b. The collar 45b should have a thickness sufficient to refrain the tip 222b of the inner tubular body 22b from being in contact with the sealing film 422b of the encapsulating structure 42b. In the meantime, when the collar 45b is peeled off, the maximum descending distance of the cap 4b, which corresponds to the thickness of the collar, permits the sealing film 422b not to be cut off from the encapsulating structure 42b. In addition, the inner surface 401b of the annular body 40b is threaded to form a second threaded portion 43b for engagement with the first threaded portion 311b so as to securely mount the threadable cap 4b to the body 3b.

When the collar 45b is peeled off, the cap 4b is allowed to descend. With the downward movement of the cap 4b by a clockwise turning force, the sealing film 422b simultaneously descends to approach the tip of the inner tubular body 22b which remains still in position. Proceeding to downwardly turn the cap 4b, the tip 222b is allowed to first penetrate the sealing film 422b, followed by cutting open the sealing film 422b by the peripheral edge 223b of the inner tubular body 22b. At the time the sealing film 422b is cut wide-open enough to let the solute 6b to drop by gravity, the solute 6b can free-fall from the encapsulating structure 42b to the storage space 300b to be dissolved in the liquid solvent 5b. The downward movement of the cap 4b concludes until the lower surface 402 of the cap 4b abuts the annular rib 312b of the body 3b. As the cap 4b is downwardly turned to an extent of less than 360 degrees, the sealing film 422b is not completely cut off from the encapsulating structure 42b and is still partly attached to the annular body 421b so as to prevent the sealing film 422b from dropping down to the storage space 300b.

FIGS. 9 and 10 are schematic sectional views of a cap for use in a container device according to the fourth embodiment of the present invention. The fourth embodiment is structurally similar to the third embodiment as described in the above, except for the structure of the cap. Accordingly, detailed description to the body is herein omitted for the purpose of simplification.

In the cap 4c of the fourth embodiment, a groove 403c is annularly formed on the inner surface 401c of the annular body 40c above the second threaded portion 43c in order to engage the peripheral rim 4240c of an inner lid 424c to cover the top end of the resilient and outwardly curved annular body 421c of the encapsulating structure 42c. An air-tight room 423c is thus formed by the annular body 421c, the inner lid 424c and the sealing film 422c for sealing the bottom end of the annular body 421c, and for an air-tight encapsulation of a solute 6c.

What is claimed is:

1. A container device, comprising:

a body having a neck integral with the top thereof, the neck being formed with an opening connecting a storage space defined by the body for receiving a first substance and being formed with an annular rib on an outer surface of the neck;

a cap member removably mounted to the neck of the body for closing the opening of the body;

an air-tight closure assembly received inside the cap member for an air-tight encapsulation of a second substance and being simultaneously movable with the cap member in an axial manner along the neck of the body, the air-tight closure assembly being cooperative with the neck of the body to seal liquid-tight the storage space of the body;

a cutting means coupled to the air-tight closure assembly for releasing the second substance from the air-tight closure assembly; and

a collar detachably attached between a bottom of the cap member and the annular rib.

2. The container device of claim 1, wherein the cap member comprises an annular body and a lid covering one end of the annular body.

3. The container device of claims 1 or 2, wherein the air-tight closure assembly is formed by an inner surface of the annular body, a bottom surface of the lid, and a sealing film circumferentially attached to the inner surface of the annular body.

4. The container device of claim 3, wherein the sealing film is made of a flexible and extendible material.

5. The container device of claim 4, wherein the sealing film is made of aluminum alloy.

6. The container device of claims 1 or 3, wherein the neck of the body is further

formed with at least an annular protrusion upwardly protruded from a top surface of the neck, allowing the annular protrusion to upwardly press against the sealing film of the air-tight closure assembly after the cap is mounted in position to the neck of the body, so as to seal air-tight the storage space of the body.

7. The container device of claims 1 or 3, wherein the collar is of a thickness that allows the cutting means to keep apart from the sealing film of the air-tight closure assembly after the cap member is securably mounted to the neck of the body by means of the collar.

8. The container device of claims 1 or 3, wherein the cap member can be downwardly turned to a maximum extent of less than 360 degrees, so as to restrain the sealing film from being cut off from the air-tight closure assembly by the cutting means.

9. The container device of claim 1, wherein the air-tight closure assembly comprises an inner annular body, an inner lid covering one end of the inner annular body, and a sealing film sealing the other end of the inner annular body.

10. A container device, comprising:

a body having a neck integral with the top thereof, the neck being formed with an opening connecting a storage space defined by the body for receiving a first substance and being formed with an annular rib on an outer surface of the neck;

a cap member removably mounted to the neck of the body for closing the opening of the body;

an air-tight closure assembly retained inside the cap member for an air-tight encapsulation of a second substance and being simultaneously moveable with the cap member in an axial manner along the neck of the body;

a cutting structure mounted inside the opening of the neck for releasing the

solute from the air-tight closure assembly, the cutting structure having a passage connecting the opening of the neck for the first substance to pass therethrough and being cooperative with the air-tight closure assembly to seal air-tight the storage space of the body to prevent leakage; and

a collar detachably attached between a bottom of the cap member and the annular rib.

11. The container device of claim 10, wherein the air-tight closure assembly is formed by a resilient, outwardly-curved annular body with one end attached to an inner top surface of the cap member and with another end sealed by a sealing film, allowing the solute to be encapsulated air-tight within the air-tight closure assembly.

12. The container device of claim 10, wherein the air-tight closure assembly is formed by a resilient, outwardly-curved annular body having an upper end and a lower end, an inner lid attached to the upper end, and a sealing film attached to the lower end.

13. The container device of claim 12, wherein the air-tight closure assembly is attached to the cap member by adhering the inner lid to an inner top surface of the cap member .

14. The container device of claim 10, wherein the cutting structure comprises an outer tubular body for holding the cutting structure in position in the opening of the neck and an inner tubular body coaxially received within and connected to the outer tubular body for releasing the solute from the air-tight closure assembly, allowing the air-tight closure assembly to axially move inside the outer tubular body in an air-tight manner with the movement of the cap member and to be cut open at the time the air-tight closure assembly is in contact with the inner tubular body.

15. The container device of claim 14, wherein the inner tubular body is formed with a tip and a cutting edge for releasing the second substance from the air-tight closure assembly.

16. The container device of claim 10, wherein the sealing film is made of a flexible and extendible material.

17. The container device of claim 16, wherein the sealing film is made of aluminum alloy.

18. The container device of claims 10, 11, 12 or 14, wherein the diameter of the outer tubular body is between a maximal diameter and a minimal diameter of the resilient, outwardly-curved annular body, and the diameter of the inner tubular body is smaller than the minimal diameter of the resilient, outwardly-curved annular body and can be inwardly pressed and deformed by the outer annular body, while the cap is mounted to the neck of the body, and the sealing film of the air-tight closure assembly can be cut open by the inner tubular body with the downward movement of the cap.

19. The container device of claims 10, 11, 12, or 14, wherein the collar is of a thickness that allows the inner tubular body of the cutting structure to keep apart from the sealing film of the air-tight closure assembly subsequent to the mounting of the cap member to the neck of the body.

20. The container device of claims 10, 11, 12, or 14, wherein the cap member can be downwardly turned to a maximal extent of less than 360 degree, so as to refrain the sealing film from being completely cut off from the air-tight closure assembly by the inner tubular body of the cutting structure.

21. A container device as hereinbefore described and with reference to the accompanying illustrations.

Dated this 26th day of November 1999.

Lily HSU

By her Patent Attorneys

WALSH & ASSOCIATES

FIG. 1

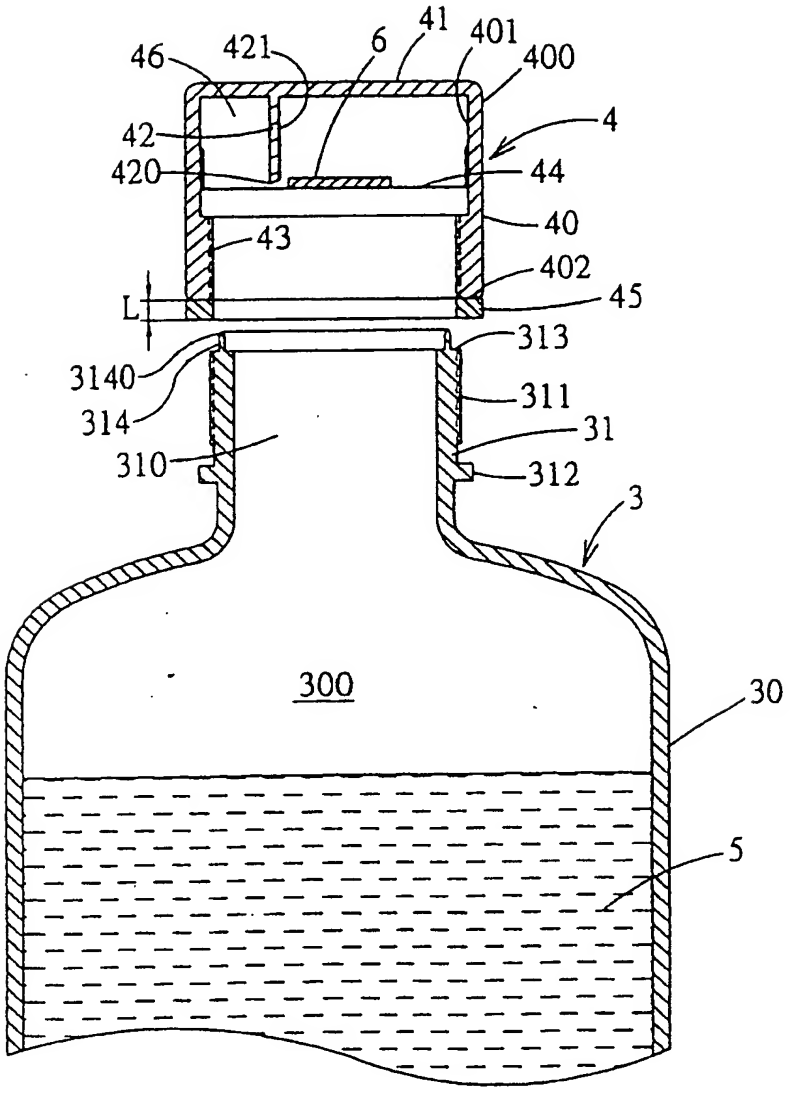

46
421
6
41
401
400
42
4
420
44
40
43
402
L
45
313
3140
311
314
31
310
312
3
300
30
5

FIG. 2

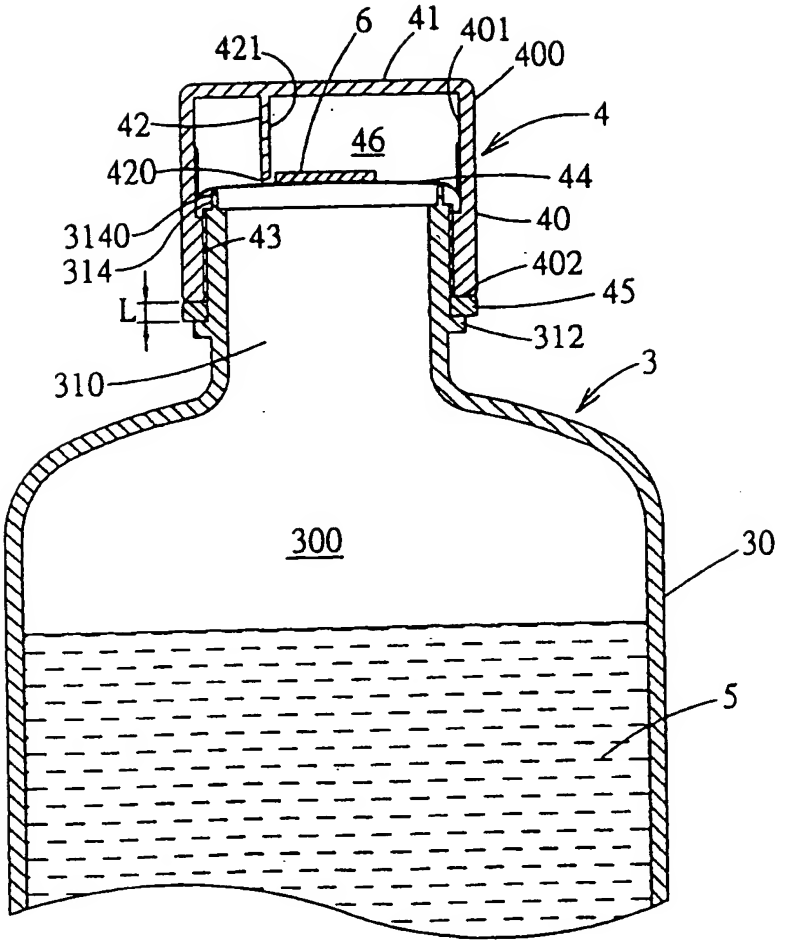

421
6
41
401
400
42
46
4
420
44
3140
43
40
314
402
L
45
312
310
3
300
30
5

FIG. 3

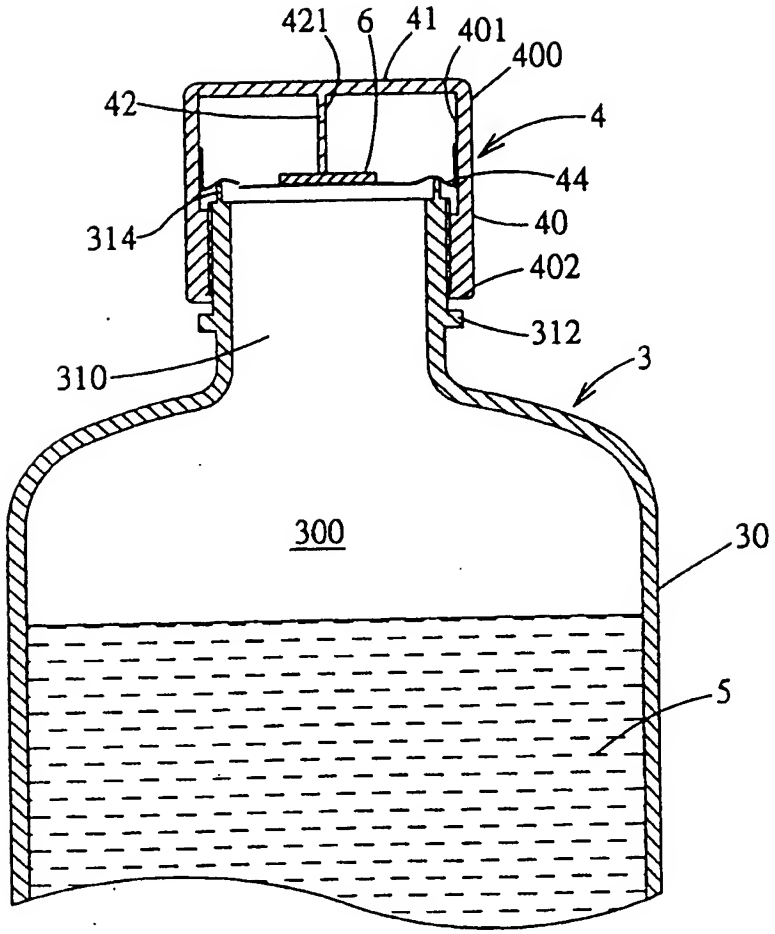


FIG. 4

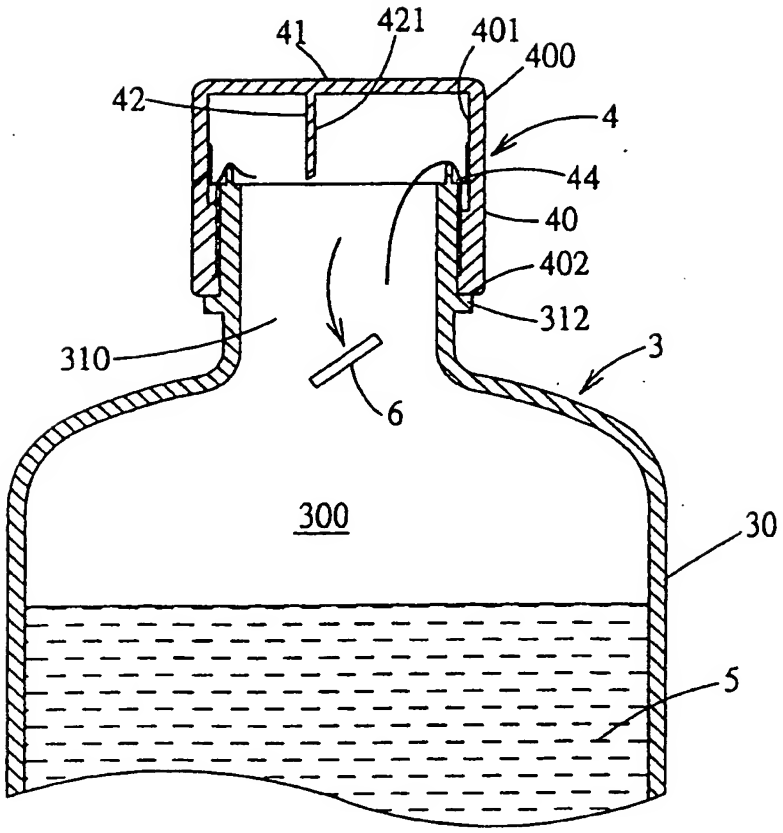


FIG. 5

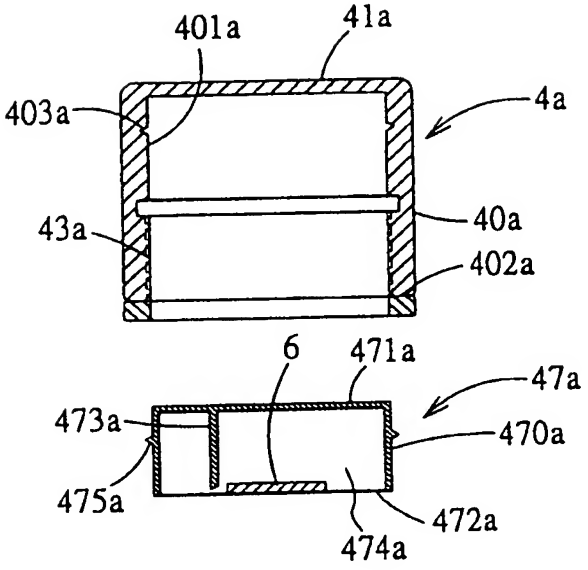

401a
41a
403a
4a
43a
40a
402a
6
471a
47a
473a
470a
475a
472a
474a

FIG. 6

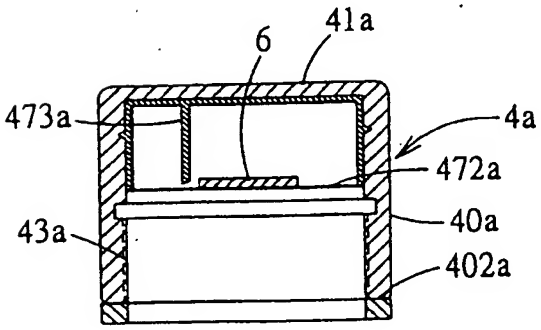

6
41a
473a
4a
472a
43a
40a
402a

FIG. 7

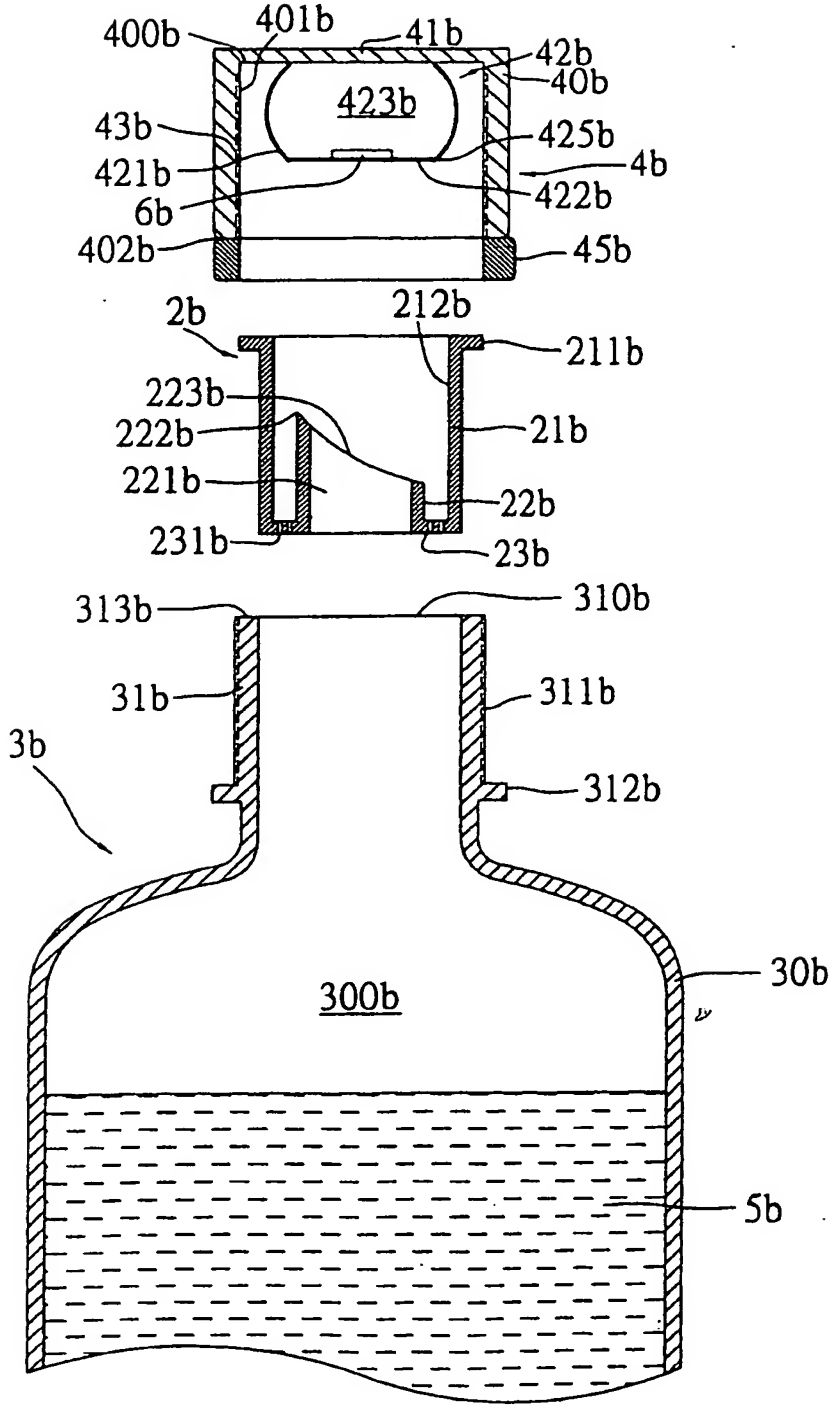

400b
401b
41b
42b
40b
423b
43b
425b
4b
421b
422b
6b
402b
45b
2b
212b
211b
223b
21b
222b
221b
22b
231b
23b
313b
310b
31b
311b
3b
312b
30b
300b
5b

FIG. 8

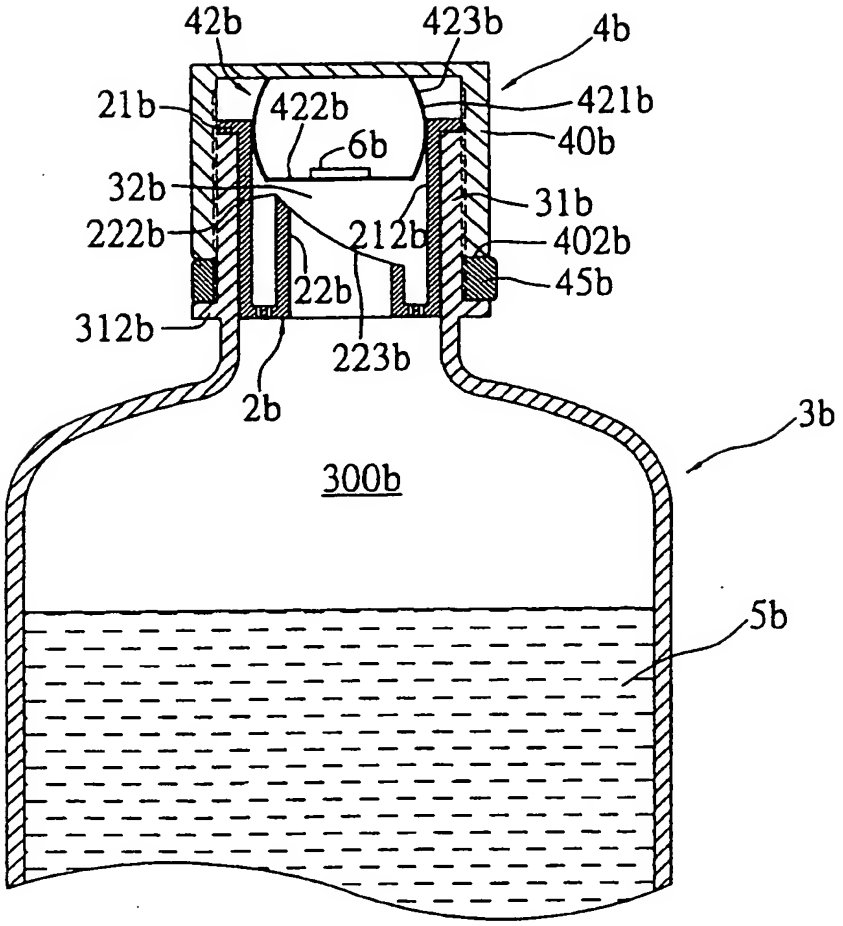

42b
423b
4b
21b
422b
421b
6b
40b
32b
31b
222b
212b
402b
45b
22b
312b
223b
2b
3b
300b
5b

FIG. 9

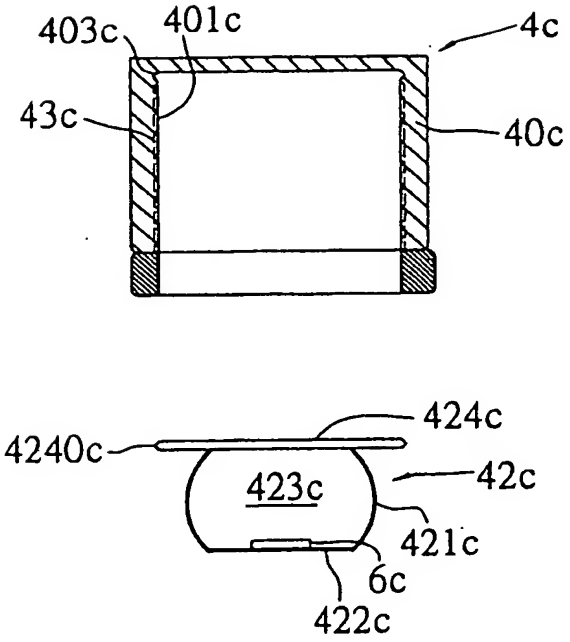
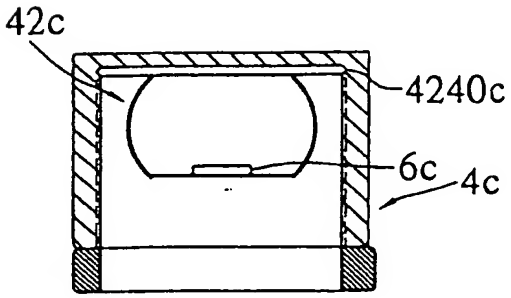

403c
401c
4c
43c
40c
424c
4240c
42c
423c
421c
6c
422c

FIG. 10


42c
4240c
6c
4c